

We claim:

Sub  
445  
1. A scintillator crystal comprising cerium doped lutetium yttrium orthosilicate.

5 2. The crystal of Claim 1 having the general composition of  $Ce_{2x}(Lu_{1-y}Y_y)_{2(1-x)}SiO_5$   
where x = approximately 0.00001 to approximately 0.05 and y = approximately 0.0001 to  
approximately 0.9999.

Sub  
395  
3. The crystal of Claim 1 having a monocrystalline structure.

10 4. The crystal of Claim 2 wherein x ranges from approximately 0.0001 to approximately  
0.001 and y ranges from approximately 0.3 to approximately 0.8.

Sub  
395  
5. A scintillation detector assembly comprising:  
15 a cerium doped lutetium yttrium orthosilicate crystal; and,  
a photon detector coupled to said crystal, whereby an electrical signal is generated in  
response to a light pulse from said crystal when exposed to a high energy gamma ray.

20 6. The detector assembly of Claim 5 wherein said crystal is monocrystalline cerium  
doped lutetium yttrium orthosilicate.

Sub  
400  
7. The detector assembly of Claim 6 wherein said crystal has the general composition of  
 $Ce_{2x}(Lu_{1-y}Y_y)_{2(1-x)}SiO_5$  where x = approximately 0.00001 to approximately 0.05 and y =  
approximately 0.0001 to approximately 0.9999.

*SCB  
APD  
CNCI*

8. The detector assembly of Claim 7 wherein x ranges from approximately 0.0001 to approximately 0.001 and y ranges from approximately 0.3 to approximately 0.8.

5 9. The detector assembly of Claim 5 wherein said coupled photon detector is selected from at least one of a photomultiplier tube, a PIN diode and an APFD diode.

*Add  
Par}*